

Notice of Allowability	Application No.	Applicant(s)	
	10/644,905	WARREN, EDWARD LAWRENCE	
	Examiner	Art Unit	
	Richard L. Leung	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
 All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to communication filed 21 August 2003.
2. ☒ The allowed claim(s) is/are 1-7.
3. ☒ The drawings filed on 21 August 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on 21 August 2003 does not fully comply with the requirements of 37 CFR 1.98 because: the entry for US-5765678 lists an incorrect inventor name, and the relevance of this document to the present invention is unclear. The entry for US-4753073 lists a misspelled inventor name. The entry for US-4207748 lists an incorrect publication date. Since the submission appears to be *bona fide*, applicant is given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b). Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

Allowable Subject Matter

2. Claims 1-7 are allowed.

3. The following is an examiner's statement of reasons for allowance: apparatuses comprising a cylinder, reciprocating piston, displacer, heat sink, load, and having a path as recited in independent claim 1 are well known in the art. An example is disclosed in US 5335506 (Byoung-Moo), which demonstrates a cylinder 31 that is closed at one end and containing a movable power piston 33 which moves in a reciprocating manner, a displacer 32 located within the cylinder 31 between the piston 33 and the top of the cylinder 31 with a means to move the displacer 32, a heat sink 41, and a path 45 from

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the cylinder below the displacer 32 through the heat sink 41 back into the cylinder above the displacer 32. Byoung-Moo fails to disclose valves to isolate the path or the means to operate the valves as required by the claim. It should be noted that the limitation "means to operate said valves," is considered equivalent to "means for operating said valves," and subsequently invokes 35 U.S.C. 112, sixth paragraph since there is no recital in the claim of structure, material, or acts in support thereof.

Therefore the limitation shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. While the use of valves for controlling fluid flow in various arrangements is also widely known in the art, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to have included valves to isolate the path disclosed by Byoung-Moo in a manner required by the claims because the working fluid in that system is understood to travel back and forth through the path whereas the isolating valves and means to operate the valves, as recited in the claim, would cause the gas to travel only in one direction through the path. Since a search of the prior art did not reveal all the limitations recited by the independent claim, either alone or in an obvious combination, all the claims are deemed allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-6799563 B1 (Warren): discloses a two stroke internal combustion engine with a piston, displacer, and flow paths with valving.

US-6199520 B1 (Warren): discloses a two stroke engine with displacer and piston.

US-6116222 (Warren): discloses a two stroke engine with a power piston and valving.

US-5485726 (Shin et al.): discloses a stirling apparatus with piston and displacer and a valved path to control pressure.

US-5465579 (Terada et al.): discloses a gas compression/expansion apparatus with flow paths having valves.

US-3698182 (Knoos): discloses a refrigeration machine with a cylinder and piston, and various gas paths and valving.

US-2616244 (Veldhuyzen): discloses an apparatus comprising a cylinder, piston, displacer, and a valving mechanism controlled by a cam.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 571-272-4811. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise L. Esquivel can be reached on 571-272-4808. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
Art Unit 3744

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DENISE L. ESQUIVEL
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700